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CENTRAL INTELLIGENCE AGENCY

REPORT

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INTELLOFAX

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SUBJECT

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Chemical Research at the I.E.N.I (KHIMGAS) Institute, Ieningrad

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SUPPLEMENT TO REPORT NO.

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III. APPENDICES

A - F no information
G Scientific Order of Battle, see attached
H Chemical Research, see attached.

IV. ANNEXURES

A Sketch map (L.E.N.I.) Institute

Appendix "C"

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SCIENTIFIC ORDER OF BATTLE

A. ESTABLISHMENTS

L.E.N.I. Institute, LENINGRAD

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In 1947 the Institute in LENINGRAD was known as KHIMGAS, a scientific institute belonging to a Ministry, thought to have been called "Fuel Gas". In 1950 a re-organization took place whereby the Institute became known as L.E.N.I. N.I. means Scientific Institute. At that time it became part of the Petroleum Ministry. At the same time a further Institute in LENINGRAD, known as the "High Pressure" Institute was amalgamated with the L.E.N.I. and there was thereafter a general flow of personnel from the High Pressure Institute to the L.E.N.I.

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The L.E.N.I. is located on the south-east outskirts of LENINGRAD at FARFOROVAYA. It consists of two main buildings and a yard on the north-eastern side of the LENINGRAD-MOSCOW railway directly opposite FARFOROVSKY post railway station. A location sketch also showing the Institute layout is given at Annexure 'A'.

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CHEMICAL RESEARCH

1. Work carried out at the LEUNA WERK

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(a) Main Research Laboratory

In July 1939 assignments within the Fuel group.

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Most of the research tasks carried out at the time were done parallel to each other. first work was on the alcoholisation of butylene to iso-octane. a commercial process on the design of the pilot plant and the production plant. Another task was the isomerisation of butane. a process for the concentration of butylene from the hydrogenation process, whereby butylene was washed with silver nitrate. This plant was not developed to the production stage because of the danger of losing valuable materials in possible air-raids.

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(b) Organic Department Laboratory

the organic department laboratory where work on special lubricants under Dr. ZORN.

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work with experiments on a 50 litre autoclave for the preparation of a synthetic lubricant from ethylene which was given the Works designation of SS 906. Parallel with that the development of ester oils.

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main work at LEUNA, under Dr. ZORN. was the re-development (or copying) of refining and de-waxing processes for a production plant which was to be erected at MOSS BIERBAUM, near VIENNA. This plant was intended to process petroleum crudes imported at the time into AUSTRIA from the BALKANS. work on the design of the production plant itself and eventually developed the process on slightly different lines which enabled it to be carried out more economically, particularly using less energy. This latter plant was not actually constructed, merely the foundations were laid in the woods, air raids and the end of the war prevented further development.

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(c) Post-war Work at LEUNA

Immediately after the end of the war it was decided to try and produce certain drugs at the LEUNA WERK This failed and no further work was carried out on it. carried out similar work on the preparation of Insulin. The result of this was that an inferior but effective product was prepared and although production started it was very soon dropped, chiefly on account of unavailability of raw materials combined with the product's inferiority.

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the North Organic Laboratory (as opposed to the organic department of the Main Research Laboratory). This North laboratory consisted of a low pressure lab, high pressure lab, and an analytical lab. As these laboratories became equipped he then carried out the following items of research:-

1) The preparation of propione aldehyde from propanol using zinc sulphide. From the aldehyde, propionic acid was prepared. This was intended as an intermediary for the WOLFEN FILMFABRIK. He supervised the construction of an oxidation plant and the actual supply of this material for WOLFEN did commence.

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2) The recovery of ethanol by hydrogenation, for which [redacted] high pressure chambers were constructed at LEUNA.

3) The preparation of normal propanol. this work was not completed and left in favor of other work.

4) The prepation of contacts for methanol and propionol oxidation.

5) The recovery of acetic acid using carbon monoxide and methanol.

6) The preparation of methyl acetate.

[redacted]

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2. Transfer to LENINGRAD

On the 22nd October 1946 eleven LEUNA WERK chemists were transported to LENINGRAD - the same time as other specialists were taken to the USSR. The group who arrived at SESTRORETSK (near LENINGRAD) was as follows :-

Dr. ECKOLDT
Dr. KAUFMANN
Dr. SMEYKAL
Dr. von der HORST
Dr. PEINZE

Dr. GEISSLER
Dr. WYSZOMIRSKY

[redacted]

Herr LORENZ

Herr FRIESE

Herr OTTO

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3. [redacted]

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(c) Production of a compound P.3

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1) $CH_3 - CH_2 - C(=O)H$ obtained from $CH_3 - CH_2 OH$

$HC(=O)H$ obtained from $CH_3 OH$

2) $CH_3 - CH_2 - C(=O)H + 2\ HC(=O)H \longrightarrow CH_3 - C(CH_2OH)(CH_2OH)(CH(=O)H)$

$CH_3 - C(CH_2OH)(CH_2OH)(CH(=O)H) + HC(=O)H \longrightarrow CH_3 - C(CH_2OH)_3$ (CaO + HCOOH)

"P3"

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this was to be used as an explosive after nitration. This compound, however, is clearly described on page 19 of CIOS 30 File XXXII/107, which indicates its use in the production of synthetic glycerine.

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As in the case of the ester oils the Russians carried out work ll quantities. Another German (possibly LOEWENBURG) the sulphur and calcium salts present as impurities in the finished product prevented the complete nitration and thus the application of this compound as an explosive.

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(d) Antioxident inhibitor for synthetic lubricant

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The assignment to prepare a small quantity of an antioxidant inhibitor as well as an anti-corrosion inhibitor (see sub (e)) was laid down requiring both inhibitors to be prepared by the beginning of June 1949. This was the only priority ever given by the Russians to work carried out by Germans

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the plant for the manufacture of these inhibitors was so elementary that the Russians would undoubtedly have no difficulty in putting the process on the production level.

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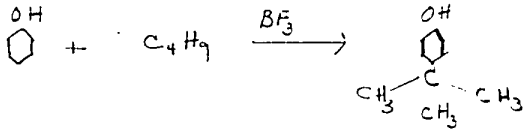
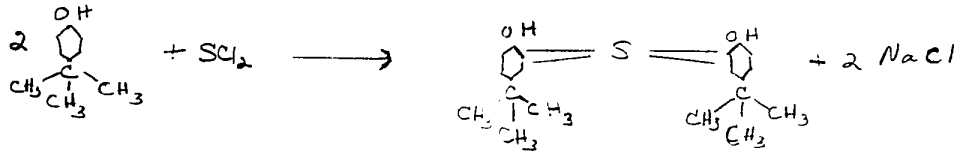
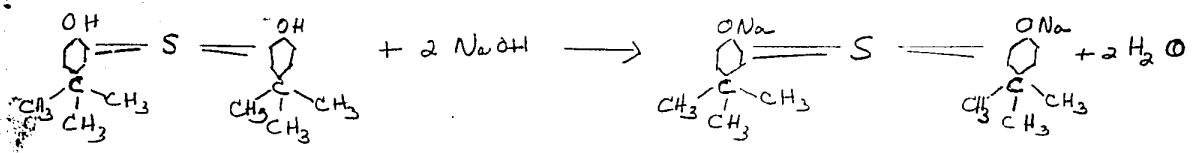


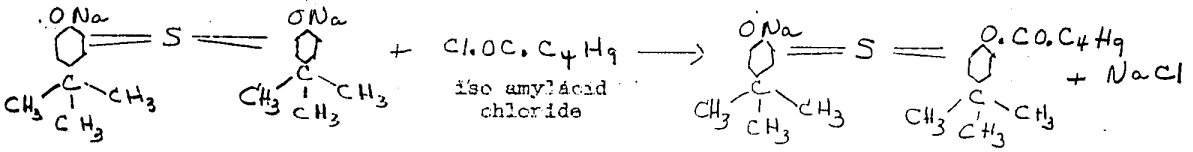
para tetiary isobutyl phenol

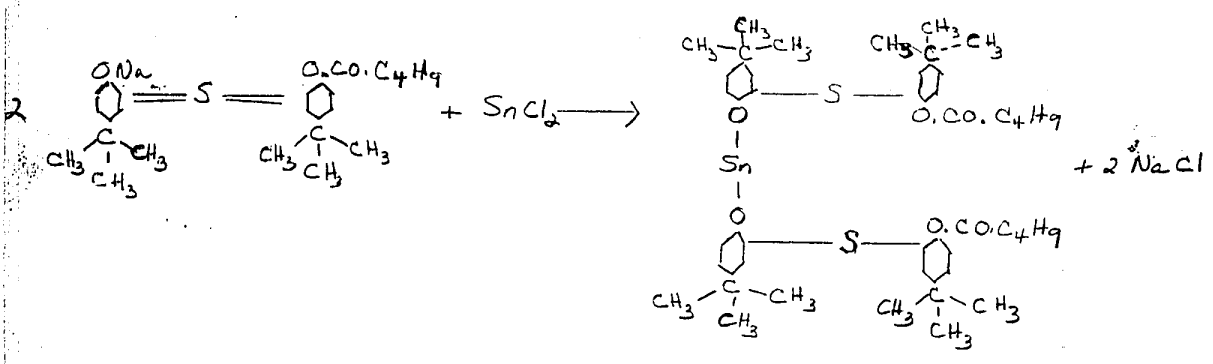


di-isobutyl diphenyl sulphide



sodium phenolate of di-isobutyl





Inhibitor

The application of this inhibitor was to make a 50% solution of it in SS 906 synthetic lubricant taken from the first run. This solution was then mixed with SS 906 synthetic lubricant giving a solution percentage of 0.02% proportion of the mixure. Besides having the effect of an antioxidant preventing the formation of gummy substances, the inhibitor had the effect of giving a higher viscosity index, with a depressed power print. [redacted] prepared a small quantity of this inhibitor in the time required. The preparation of this compound known as Inhibitor 'R' or Z.S.I. is described in CIOS 30 File XXXII-107 page 71

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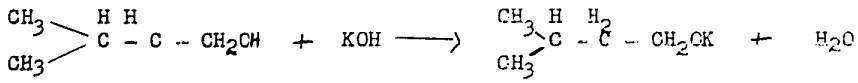
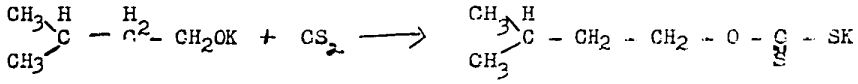
'Appendix H'
5th page

(e) Anti-corrosion inhibitor for synthetic lubricant

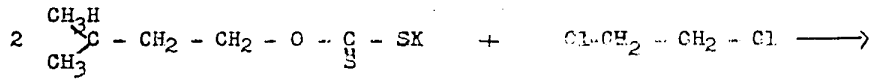
The preparation of an anti-corrosion inhibitor which had the LEUNA WERK trade name of MESULFOL was included in the priority with the antioxidant described in para.(d) above. MESULFOL, besides being an anti-corrosion inhibitor provided increased lubrication efficiency for higher pressures and applied as a component of weapon oil. In Germany weapon oil was a mixture of mineral oils, ester oils and a natural oil extracted from pigs claws. This natural oil was replaced in the mixture by SS 906 synthetic lubricant which had 4% of MESULFOL inhibitor in it. The preparation of this inhibitor is as follows:-

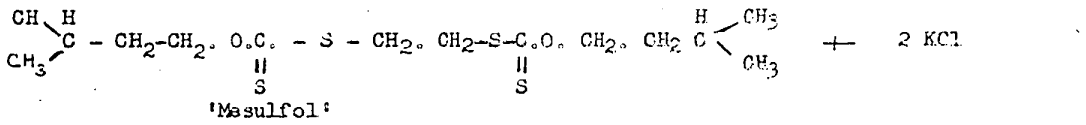


Iso-amyl-alcohol



Iso-amylxanthogenate potassium





'Masulfol'

This compound is also referred to in CIOS 30 File XXXII-107 pages 73 and 76.

(f) Adipic Acids

[redacted] 50X1-HUM

At the LEUNA WERK there was a plant for the production of adipic acid which the Russians had dismantled and taken to Russia complete with the personnel operating it. [redacted] believes this to have been erected in DZERZHINSK. 50X1-HUM
The process was where vinyl, cresyl and para-isobutyl phenol are oxidised to adipic acids, and [redacted] 50X1-HUM
it appears that the Russians did not seem to have any interest in adipic acid outside nylon production [redacted]

(g) Hydrogenation Group

[redacted] the Hydrogenation group which consisted of 50X1-HUM
KAUFMANN and LORENZ. Since coming to the Institute these two had been employed at the re-erection of a LEUNA WERK twin-stall hydrogenation plant for the hydrogenation of tar. At this work they did no active research, it consisted merely of actual reconstruction, calculations and measurements conducted in connection with the running of the plant, etc. [redacted]

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[redacted]

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4. General observations regarding conditions in the L.E.N.I.

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(a) upon arrival at the L.E.N.I. the equipment was restricted to glass flasks all of which bore the JENA trademark, and an extremely restricted number of chemicals. this gave a catastrophic effect in comparison to what they were accustomed as research chemists in the LEUNA WERK laboratories. During the whole time they spent at L.E.N.I. their equipment was very gradually increased so that by the time of their repatriation they had the laboratory almost equipped up to the LEUNA WERK standard.

(b) Most of the glass equipment which they received at L.E.N.I. was stamped JENA and this was up to JENA's normal standard. However, included among it was always a proportion of Russian glassware which was inferior as far as they were concerned for two main reasons: the first of these was that the glass itself was inferior and the equipment would break after being used two or three times; secondly the gradation and markings on glassware was clumsy and confusing to the Germans. They therefore chose to use German glassware all the time and

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The possible exception to this is that Russian thermometers with which they worked were definitely inaccurate and had to be standardized by comparison with German thermometers and a conversion formula calculated for each.

(c) Regarding Russian non-glass laboratory equipment such as chemical balances although apparently accurate they were outmoded and similar in design to what one expects to find only in educational establishments.

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(d) the Russian chemicals available to him were impure.

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(e) Regarding laboratory staff the laboratory assistant was a type who completely unskilled in laboratory work and their numbers in the Institute were very limited. Their place was taken by a higher number of chemists than one would expect in a European laboratory of similar nature. The standard of education of these chemists affected by a general shortage of laboratory equipment prevalent in the USSR. That this shortage existed was evident, since not only Russians from other laboratories of his institute, but research staff visiting from LENINGRAD Universities begged to take away even ordinary glass equipment which had been allotted this state of affairs could be made apparent, it must reflect a serious shortage of equipment allotted for educational purposes. A further reflection was the undoubted lack of practical ability which newly qualified chemists possessed when joining the Institute straight from the University. Those coming lacked both practical skill and that type of knowledge which is only gained by practical experience: on the other hand theoretical knowledge which comes from reading alone had apparently been well instructed and learned. The way in which these chemists took to practical work was various. Those who had an interest in it were as quick, if not quicker, than the average European student in acquiring skill in research. There were, however, a large proportion of chemists who had no interest in the work since apparently, the Russian educational system is not one of free will and University undergraduates are allotted to science subjects according to some system, possibly of supply and demand, as opposed to the choice of the student. Thus, chemists were being trained who never in their lives would become efficient research workers. Another observation, relevant to Russian chemists, is that they never derive any pleasure from their work, being affected the whole time by fear instead. Their fear that

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things might be seen to have gone wrong by their superiors is sufficient to guide them away from any measure of interest to complete a research assignment. [redacted] a distillation apparatus breaks durings its operation in the laboratory. The Russians are courageous enough to approach the broken apparatus in order to put out the fire etc., but then their next instinct, instead of opening all the doors and windows to let out the fumes as one would expect, is to rush madly to all the doors and windows and lock them in order to have the whole thing tidied up before their superiors find out anything about it.

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- end -